# Energy Efficiency: LED Retrofits for Slot Machines

## Tribal Casino Best Management Practices

## What?

Slot machines at tribal casinos use a variety of illumination lamps (bulbs), including both incandescent and energy efficient lights (fluorescents and light emitting diodes - LEDs). Though fluorescent lights are considerably more efficient than incandescent bulbs, LEDs are even more efficient, last significantly longer than incandescent and fluorescent lights, and generate very little heat. Because slot machines typically operate 24/7, year-round, their energy consumption is a good target for efficiency gains. In addition, minimizing slot machine maintenance and downtime is a high priority for casinos, and LEDs require less frequent replacement. Many light vendors now offer direct LED retrofits for fluorescent and incandescent fixtures in most slot machines.

## Why?

- **Saves Money:** Replacing fluorescent lights with LEDs pays for itself in less than one year (see page 2).
- **Reduces Energy Demand**: LEDs use 40 to 60% less electricity than the fluorescents they replace.
- **Reduces slot machine downtime and labor costs**: On average, changing fluorescent bulbs and ballasts in 100 slot machines requires 1 to 2 hours/week more labor than machines using LEDs.
- **Reduces cooling requirements**: LEDs produce very little heat, reducing the cost of heating, ventilation, and air conditioning (HVAC) by $1 - $3/year per LED lamp, depending on electricity rates.
- **Easier, cheaper disposal –** LEDs can be disposed of in regular trash, while fluorescents require special handling and disposal as "Universal Waste" because they contain mercury.

## How?

1. Identify LED retrofit vendors and machines with available replacement kits.
2. Target slot machines that will be used for at least 2 more years.
3. Retrofit either with gradual replacement as fluorescent lamps burn out, or convert over shorter time period.

## Challenges:

- **Scheduling:** Slot machine maintenance and servicing needs to be scheduled to minimize downtime and adhere to security policies.
- **Documenting Savings:** Slot machine energy use is hard to separate out from the rest of casino equipment and activities; therefore direct measurement of slot machines is usually required to document savings.



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## Equipment:

LED Retrofit Kits: Low power, low heat, mercury free (LED vendors typically claim up to 100,000 hour life expectancy, but depending on quality and heat conditions, LEDs last about 5 years); kits use same mounts as fluorescents and also eliminate the fluorescent ballast

## Savings and Cost Analysis for Each LED Light Retrofit

| | Fluorescent (38 watt lamp) | LED (17 watt array) | Savings |
|---|---|---|---|
| **Energy Savings**[1] | **332 kWh/yr** | **149 kWh/yr** | **183 kWh/yr** |
| **Energy**[2] | **$48.85/yr** | **$22.12/yr** | **$24.72/yr** |
| **Maintenance Labor** | **$14.60/yr**[3] | **$1.67/yr**[4] | **$12.93/yr** |
| **Lamp/Ballast Replace.** | **$54.00/yr**[5] | **$8.00**[6] | **$46.00/yr** |
| **Disposal** | | | **~$3.00/yr** |
| | | **Annual Savings** | **$86.65** |
| | | **Cost of LED Retrofit**[7] | **$52.50** |
| | | **Simple Payback** | **0.61 years** |

## Resources:

LED Retrofit Kits: http://www.happcontrols.com/lighting/91101700.htm

LED Retrofit Calculators:

www.happcontrols.com/wp/led-calc.p (specifically for slot machines)

www.creelighting.com/calculator.aspx (general LED replacement)

Energy Star LEDs: www.energystar.gov/index.cfm?c=ssl.pr_why_es_com

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1 Energy Savings: ($ cost of lamp/yr-lamp) (1 kWh/$0.15)

2 Based on $0.1351/kwh. Energy Information Agency: Commercial Rates – May 2009: http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html

3 Maintenance - Fluorescents = (1 lamp/5,000 hr) (8,760 hr/yr) ($25/hr) (1 hr/3 lamps) = $14.60/year

4 Maintenance - LEDs = (1 lamp/43,800 hr) (8,760 hr/yr) ($25/hr) (1 hr/3 lamps) = $1.67/year

5 Fluorescents Replacement Lamp/Ballast: ($1.30/lamp + $25.70/ballast) (2 replacements/year) = $54.00/year

6 Annual LED Replacement Cost: ($40/LED kit) (1 replacement/5 year) = $8.00/year

7 Cost of LED Retrofit: ($40/LED kit)+($25/hour labor)(0.5 hours) = $52.50